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ABSTRACT

This teaching kit features six activities focused on helping students understand the significance of the world population reaching six billion for our society and our environment. Featured activities include: (1) History of the World: Part Six Billion; (2) A Woman's Place; (3) Baby-O-Matic; (4) Earth: The Apple of Our Eye; (5) Needs vs. Wants; and (6) Six Billion Reasons. (WRM)

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Countdown to Six Billion Teaching Kit

...Use the enclosed teaching activities to accompany the lesson ideas on the back of your Countdown to Six Billion *wall chart.*

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The world population will reach SIX BILLION in 1999.

Countdown to six billion with your students...

You hold in your hands ZPG's ***Countdown to Six Billion Teaching Kit***. The *Teaching Kit* features six activities focused on helping students understand the significance of the upcoming demographic milestone for our society and our environment. Each activity requires little preparation, but guarantees memorable classroom experiences. Some are designed for a quick lesson on such concepts as land use patterns or the motivations behind family size. Others offer your students more extended opportunities for research and writing.

As we neared completion of this teaching kit, we received good news from the United Nations: New population estimates show a slight decline in growth rates. This means that the world population will reach six billion later than they had originally announced. The official "Day of Six Billion" has been moved from June 16, 1999 to October 12, 1999. "This is very encouraging news," said Dr. Nafis Sadik, Executive Director of the United Nations Population Fund. "However, world population is still increasing by 78 million people a year." (UN Press Release, October 28, 1998). The UN's announcement also ensures that this kit will be timely well into the future.

ZPG's *Population Education Program* has developed a wealth of additional activities, available through our curriculum guides and demonstrated in our teacher training workshops. These activities are designed to help you meet the standards established by the National Council for the Social Studies, the National Center for History in the Schools, and the National Council for Geographic Education. Thank you for sharing these activities with colleagues. We welcome your comments, and wish you a thoughtful commemoration of this demographic milestone.

Activities Inside:

History of the World: Part Six Billion p. 2
Students research one aspect of human history as it relates to population changes.

A Woman's Place p. 3
A thought-provoking reading on population growth, gender and culture, followed by discussion.

Baby-O-Matic p. 5
Students take a short quiz to determine how many children they are likely to have based on their lifestyles.

Earth: The Apple of Our Eye p. 7
A dramatic demonstration simulating distribution of farmland.

Needs vs. Wants p. 8
Students prioritize resources that they use.

Six Billion Reasons p. 9
Students research and diagram news articles to analyze their links to population issues.

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History of the World: Part 6 Billion

Concept:

Just as historical events and advances in science and technology have shaped population trends, population growth over time has also led to changes in lifestyles and community infrastructures. In this activity, students conduct research and write a paper tracing the evolution of one aspect of our present society as it relates to population changes.

Materials:

Research materials from the library and/or Internet

Introduction:

In the early days of human society, there were few rules governing people's everyday existence. With so few people living in sparsely-populated communities, there was little need for laws to govern how people acquired food, disposed of waste, moved from one area to another, or educated their children. Over the millenia, social structures and environmental management have changed as the human population has grown, necessitating more organization and cooperation. Advances in science and technology have also been spurred on by population growth. We are continually trying to find ways to provide more goods and services more efficiently to meet the needs each year of 78 million more people on the planet (and nearly three million more in North America). The history of almost every aspect of our present lifestyle can be linked to the demographic history of the world.

Procedure:

Assign students the following research project. They are to select one of the topics from the list and trace the evolutionary steps from practices in ancient history (or as far back as they can find data) to the present. They may use research materials from the library and Internet. Their research may result in a written paper or a flow chart plotting progression. In either case, students need to show how and why the changes in practices have been influenced by population changes. For each topic given below, suggested benchmarks give students indications of how they might structure their research and organize their flow charts.

For example, about 12,000 years ago, several cultures shifted from hunting and gathering to farming. There were about 5-10 million people worldwide at that time. Students can then illustrate how significant points in agricultural development, transportation and preservation of food, eating habits, and introduction of new edible species in different parts of the world have related to population trends.

Suggested Research Topics:

Acquiring Food

Benchmarks:
hunting/gathering; development of agriculture; discovery of new, edible species like corn or potatoes; irrigation and other technological advances; dietary changes; transportation

Land transportation

Benchmarks:

foot; horse/carriages; railroad system; automobiles; road and interstate systems; traffic laws; emissions testing; gas conservation; light rail/subway/modern public transportation

Waste disposal

Benchmarks:
dump in waterways/bury/burn at home; development of community dumping grounds; sanitary landfills; recycling and composting

Drinking water

Benchmarks:

straight from the source such as a stream; creating wells; indoor plumbing; municipal water treatment

Commerce

Benchmarks:
bartering; development of monetary systems; family-owned, local businesses; large "chain" businesses; international trade and global partnerships

Community development

Benchmarks:
villages; towns; cities; metropolitan areas including suburban sprawl; megacities with shantytowns in less-developed countries

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A Woman's Place

Concept:

The status of women around the world is closely linked to fertility rates, as students discover in the following reading and discussion.

Introduction:

In every country and culture, women play vital roles in society, but often their contributions are undervalued. Women around the world have made great progress in improving their lives and the lives of their families, but they still face many inequities in political representation, economic well-being, health, and human rights. These inequities affect entire societies, as there is an increasing amount of evidence that improving the status of women is key to improving the health and well-being of families and stabilizing fertility rates around the world. In this activity, students explore the complex relationship between women's status, development, and fertility.

Procedure:

1. Give each student a copy of the student reading *Fatima's Story* with the accompanying discussion questions. Explain to the students that *Fatima's Story* is the story of a woman who lives in sub-Saharan Africa but her situation is typical to that of women in many countries in Africa, Asia and Latin America.

2. After the students have had a chance to read *Fatima's Story*, divide the class into small groups of four to six students and have them answer the discussion questions on the worksheet as a group. Once students have had a chance to discuss each with their group, go over the questions as a class. Be sure to save time to discuss the question "What would you do if you were Fatima?"

3. Have each group do a role-play of what Fatima and Jalal Din might do in this situation. The main characters would be Fatima, Jalal Din and Jalal Din's mother; other students could play the roles of Zarin or Aziz, the local teacher, the local family planning worker, a relative, a concerned neighbor, or the narrator.

Adapted from "A Woman's Place" in *Earth Matters: Studies for Our Global Future*, ZPG, 1998. Based on the activity, "The Value of a Son, The Value of a Daughter," appears in *Choose a Future!: Issues and Options for Adolescent Girls*, The Centre for Development and Population Activities, 1996.

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A Woman's Place

Student Reading: Fatima's Story

Fatima is a mother with five children — the son, Aziz, and four daughters.

Her husband, Jalal Din, is a reliable man and a good father. He and Fatima are farmers and they work hard together in the fields.

They all live together with Jalal Din's mother, who is a widow. She is a good woman, but she is always critical and nags at Fatima. In fact, she talks from early morning until she goes to bed. "When are you going to light the fire? It is broad daylight already!" And, "Wives should obey their husbands." Sometimes she criticizes Fatima for work not done, sometimes for spending too much money. And she always complains that Fatima has produced only one son and burdened her dear Jalal Din with one daughter after another!

Fatima has learned to live with her mother-in-law and to keep her mouth closed. In this way, she is a very dutiful wife and daughter-in-law. But she did do something in secret last month — well, it was a secret between her and Jalal Din — which they didn't tell Jalal Din's mother. Fatima started practicing family planning. The big reason she made this decision was that she wasn't feeling very well. As you know, having 5 children in 9 years can make a woman feel unwell. She has a backache and she is tired most of the time. But she has so much work to do — finding firewood, carrying water, preparing food, washing the family's clothes, working in the fields — when can she rest?

But there was another reason Fatima started using family planning. It was because of her eldest daughter, Zarin. She is the first child — and a lovely little girl, a joy to everyone.

Zarin goes to school along with Aziz. Every afternoon she brings her exercise book home and proudly reads to her mother what she has written. She is so happy in school! But Fatima knows that if she has another baby, Zarin must leave school to care for the new baby while Fatima works in the fields. There is simply no other way all the work can be managed. In a way, Zarin knows this too — because she has seen this happen to her little friends. Almost all of them no longer go to school, but instead care for younger brothers and sisters.

Today there is a terrible scene in the house when the family gathers to eat. The old woman is wailing and pulling her hair. They family is alarmed and gather around her where she sits on the floor. Between sobs, she finally tells them what is wrong. At the village well this morning, she talked with an old friend who told her someone had seen Fatima at the family planning clinic.

"You are very bad!" she shouts at Fatima. "And you will pay! You will pay for such wickedness. Now you will have no more sons. And who will care for you in your old age? Aziz is a good boy, but he is only one. A family needs many sons. Think of our name. Who will help Jalal Din in the fields? Who will take care of me, if God forbid, something happens to Jalal Din?"

Jalal Din sits next to his mother and comforts her. And he looks at Fatima as if he doesn't know what to do. Zarin is also looking at Fatima. She knows what this is all about — at least she knows what it will mean to her. There are tears in her eyes.

Fatima really has a problem. What would you do if you were Fatima?

Discussion:

1. What are Fatima's problems? What are her concerns?
2. What are some of the things that Fatima must do every day for her family?
3. If Fatima was married when she was 16, about how old is she now? What if she was married at 23? Might she be better suited to start a family at one age versus the other?
4. What are the concerns of Fatima's mother-in-law? Why is it important for her to have grandsons? Is she concerned about the effect on her granddaughters of another baby in the family? What does this say about how she values her granddaughters?
5. What are some reasons sons are more highly valued than daughters in Fatima's culture?
6. How do Fatima and Jalal Din's views differ from those of his mother? Is there a generation gap?
7. Why did Fatima and Jalal Din decide to start practicing family planning? Do you think it was a wise decision?
8. How might it benefit Fatima and her family if she has no more children? How might it benefit Fatima and her family if she had another son?
9. What will happen to Zarin if her parents have more children? How might it affect her future?
10. What should Fatima do about her mother-in-law and her wish to have more grandsons? How could her husband help? What would you do if you were Fatima?

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Baby-O-Matic

Concept:

The number of children each of us has is closely correlated to our lifestyles and the norms of our society. Students examine several such factors, and use their responses to determine how many children they, or someone of their background, would likely have.

Procedure:

Distribute the worksheet to your students. Allow a few minutes for the students to individually answer the questions and calculate their results. Go over the discussion questions with the class.

Discussion:

A. How many children did each of your students come up with? What was the class average?

B. Go over these notes below with your students. Each number corresponds to a question on their worksheet. You may wish to frame the notes as questions (e.g. Why do you think that this is a factor?)

1. Family life:
The number of children a woman bears varies with her status in the household. Women that are able to play a part in important decisions often choose to have fewer children. In some cultures, women don't have any say about the number of children they bare.

2. Education:
The more education someone has had, the fewer children they typically have. As one indicator, people that are literate have fewer children than those who can't read.

3. Social security:
People tend to have more children if they see no other way of supporting themselves in old age.

4. Status symbols:
In many cultures, large families are important status symbols. In other areas, our personal successes better represent our status in society.

5. Time and money management:
In some cultures, children are considered a drain on their parents' time and money. In other cultures, each child represents an additional worker that can help support the household, or enable the parents to get more work done.

6. Health:
People often have larger families as insurance, when they are unsure whether their children will survive their childhood. In the United States, for example, an average of 7 children out of 1,000 die in infancy. Compare this to the West African country of Sierra Leone, where out of 1,000 children, 195 die in infancy (nearly 1 in 5).

7. Personal beliefs:
Societal pressures often pull people towards having very large or small families. When people are able to make their own decisions about how many children to have, the number approaches two per couple in North America.

8. Timing:
The longer people wait before starting their families, the fewer children they will have. This is partly owing to our "biological clocks". Also, people that choose to wait longer to have children often build careers for themselves, and so their priorities change.

C. Did any students think the BABY-O-MATIC gave them the wrong answer? (It is often possible to find variations among individual cases. A person with little schooling, for example, could conceivably have a small family. However, taken in total, statistics bare each of these factors out.)

Follow-up Activity:

Assign each of your students a different country, so that they can conduct research into the lives of people there. Have your students retake the quiz, this time from the perspective of a person in their assigned countries. What changes have they observed? How do their calculations compare to the actual demographic data from that country?

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Baby-O-Matic

STUDENT WORKSHEET

Want to know how many children you'll have? Take the BABY-O-MATIC Quiz!

For each number, circle the statement that best describes you and your lifestyle:

1. Family life:

A. I plan never to marry.
B. When I marry, both I and my spouse will share in important decisions.
C. When I marry, only the man in the couple will make important decisions.

2. Education:

A. I don't know how to read, and I don't expect I will ever learn.
B. I know how to read, but I do not expect to graduate from high school.
C. I will definitely finish high school, and may continue my formal education.

3. Social security:

A. When I grow old, or am unable to work, I expect my family to provide for me.
B. I hope to rely on my personal savings, when I grow old, or am unable to work.
C. When I grow old, or am unable to work, the government will take care of me.

4. Status symbols:

A. I believe that the position I hold in the workplace, and the money that I accumulate in life are the most important gauges of how successful I have been.
B. A large family is much more important to me than a successful career.
C. My status in the workplace is important to me, but family is equally important.

5. Time and money management:

A. Raising children takes a lot of time and money, and I would rather be doing other things with those resources.
B. Raising children may be expensive, but is something that I want to do with my life.
C. My children will be very useful to me as workers, and will help support the family.

6. Health:

A. If I have children, I'd expect them to have long, full lives.
B. If I have children, there is a good chance that they wouldn't live very long.

7. Personal beliefs:

A. I have been taught that my responsibility in life is to have as many children as I can, and I intend to do just that.
B. I believe that no one should tell me how many children I should have. That decision is for me and my spouse to make.
C. I believe that the world just has too many people, and we'd all be better off if there were fewer.

8. Timing:

A. I'd like to be a parent by the time I turn 20.
B. If I'm not a parent by the time I turn 40, no problem.
C. I'd like to be a parent by the time I turn 35.

Give yourself points as follows	Your Score	
1 A 1, B 2, C 3	11	0 children
2 A 3, B 3, C 2	12-14	1 child
3 A 3, B 2, C 2	15-17	2 children
4 A 1, B 3, C 2	18	3 children
5 A 1, B 2, C 3	19-24	4 or more children
6 A 2, B 3		
7 A 3, B 2, C 1		
8 A 3, B 1, C 2		

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Earth: The Apple of Our Eye

Concept:
A visual demonstration illustrating the limits to our sources of food.

Materials:
An apple, a knife and a paper towel.

Introduction:
Two hundred years ago, most of America's croplands had at least 21 inches of topsoil; today, it is down to around six inches. The U.S. lost six million acres of prime farmland between 1982 and 1992—an area roughly equivalent in size to Vermont. Four of those six million acres were lost to urban and suburban expansion. The other two million acres, or one billion tons of topsoil, were lost through erosion caused by deforestation, unsustainable farming practices and animal grazing. Worldwide, we lose 25 billion tons of topsoil per year.

Procedure:
Slice the apple according to the instructions, following with the italicized text (see quick reference box). Use the discussion to encourage critical thinking about these facts.

1. Hold the apple out so the class can see it.
   "This apple represents our planet."

2. Cut the apple into quarters. Hold out 3/4 in one hand and 1/4 in the other.
   "What do these 3/4 represent? (Water.) So, only 1/4 of the Earth's surface is land."

3. Set the 3/4 representing water aside. Slice the remaining 1/4 representing land in half, lengthwise. Take 1/8 in each hand, and hold out one of them.
   "1/8 of the Earth's surface, or half of all land, is inhospitable to people and to crops: these are the polar regions, deserts, swamps, and high or rocky mountains."

4. Set that 1/8 aside and hold out the other.
   "This 1/8 of the Earth's surface, the other half of all land, represents the total area on which people can live, but can't necessarily grow food."

5. Slice this 1/8 lengthwise into four pieces. Hold out 3/32 in one hand and 1/32 in the other.
   "Each of these pieces represents 1/32 of Earth's surface. These three represent land that never was arable because it's too rocky, wet, cold, steep or has soil too poor to produce food. They also contain land that was once arable but is no longer because they've been turned into cities, suburbs, highways, shopping centers, schools, parks, factories, parking lots and other forms of development that make them incapable of growing food."

6. Set 3/32 aside and hold out 1/32.
   "So, only 1/32 of the Earth's surface has the potential to grow the food needed to feed all the people on Earth."

7. Carefully peel the 1/32 slice of Earth, and hold this peel up so they can see it.
   "This tiny bit of peeling represents the topsoil, the dark, nutrient-rich soil that holds moisture and feeds us by feeding our plants. The U.S. currently loses an inch of topsoil every 16 years. Because it takes nature 500 years to build one inch of topsoil, it is considered a non-renewable resource."

Discussion:
How can we preserve farmland?

Suggested Answers:

a. **By not building anything on arable land:** Land covered up by buildings, highways and other forms of development can't be used for growing crops.

b. **By eating lower on the food chain:** While one billion people suffer from malnutrition and starvation, the world's cattle alone (not to mention pigs and chickens) consume a quantity of food equal to the caloric needs of 8.7 billion humans. We devote 56% of U.S. agricultural land to the production of beef. For each acre of American forest that is cleared for development, *seven* acres of forest are converted into land for grazing livestock and/or growing livestock feed.

c. **By reducing pollution:** Pollution impairs the ability of the land and the seas to provide food that's both sufficient in quantity and free of contaminants.

d. **By stabilizing human population growth:** Quite simply, the more people there are to feed, the less food there is to go around. Food supply is an excellent example of the relationship between any resource and the *size* and *consumption patterns* of the population that depends on it.

Whole Apple = Planet Earth

3/4 = Water
1/4 = Land

1/8 = Uninhabitable & Unarable Land: poles, deserts, swamps, high/rocky mountains
1/8 = Habitable Land

3/32 = Habitable, but not arable land, due to development
1/32 = Arable Land

1/32 Peel = Topsoil

This activity appears in ZPG's teaching kit, *People and the Planet: Lessons for a Sustainable Future*. The activity originally appeared in KUITATK, a Native American Science Education Association Issue Publication

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Needs vs. Wants

Concept:

Students differentiate necessities from luxuries as a means to consider resource consumption in our society.

Introduction:

In North America, we live in a culture that emphasizes abundance. Students are constantly bombarded with messages that tell them to want and seek more material goods. In such an environment, it can be difficult for them to appreciate what they already have, much less understand what it means to live with less. In this activity, students clarify the difference between needs and wants, reevaluate their consumption patterns, and determine what they would be willing to sacrifice to accommodate others.

Procedure:

1. Instruct students to draw a line lengthwise down the middle of a sheet of paper. Students can work individually or in small groups.

2. On the left side they will list the basic needs of every human being: water, food, clothing, shelter, etc.

3. On the right, they will list the things they need or want for their own lifestyles: color-TV, stereo, video game system, car, fast food, movies, hot water, etc. Next to each item, they should name some of the resources or products needed to produce, use, and maintain these things: oil (for plastic and fuel), electricity, iron, aluminum, pesticides, grain, water, etc. Give the students enough time to write 10-15 items.

*Note: **The teacher may want to go through some of the examples of products we use regularly, and the resources they are made from or use to operate, to get students started.***

4. Tell them to select three items on the right that they would be willing to give up so that people who currently lack the basic necessities (listed on the left) can survive. Have them cross those items off their lists.

5. Tell the students to select an additional three items. Have them cross those items off their lists.

6. Continue to have students cross out items until they only have a few left.

Sample chart:

Basic Necessities	My Needs or Wants	
food	stereo	(oil--for plastic, electricity, steel)
water	TV	(metal, oil--for plastic, glass, electricity)
shelter	fast food hamburger	(grain, pesticide, oil, fertilizer, wood, metal, beef)
clothing	hot water	(water, oil or gas, copper, lead, iron)

Discussion:

1. Which were the first items to go on your list? What did you elect to keep? Why?

2. Do you think that most North Americans would be willing to lower their consumption level to help others in developing countries? Why or why not?

3. Are there any alternatives to giving up those items on your list? What are they?
Sharing, using less of everything, recycling, finding more efficient/less wasteful ways to make or run products.

4. How do you think that giving up these items on your list would affect your happiness? What makes you the happiest? What do you most enjoy doing?
Make a list on the board — be sure to include items like friends, family, playing sports, reading, singing, playing in a band, etc.

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Six Billion Reasons

Concept:

Many newsworthy trends and events are related to population pressures. Students diagram news articles to analyze their links to population issues.

Introduction:

Reports of our growing world population are regularly in the news. Sometimes the stories are straightforward, and speak explicitly about our increasing numbers. Often, though, readers have to carefully analyze stories in order to connect them to population growth. In this activity, students find news articles, and analyze their content to develop a matrix which relates the articles to population pressures, examining the causes, effects, and possible solutions.

Procedure:

Ask your students to each collect at least two newspaper or magazine articles that can be related to our growing population. Suggest that they use the local library and the Internet. They may also use a summary of a news show or television documentary. The following topics represent just a few of the many that students may wish to use as guides in their search.

Air pollution in fast-growing cities

Urban sprawl and the loss of rural areas

Food and water shortages around the world

Legislation to provide insurance coverage for contraceptives

Power shifts as populations change

Overfishing

Efforts to establish nature reserves in developing countries

Traffic congestion and "road rage"

Challenges in completing an accurate U.S. census

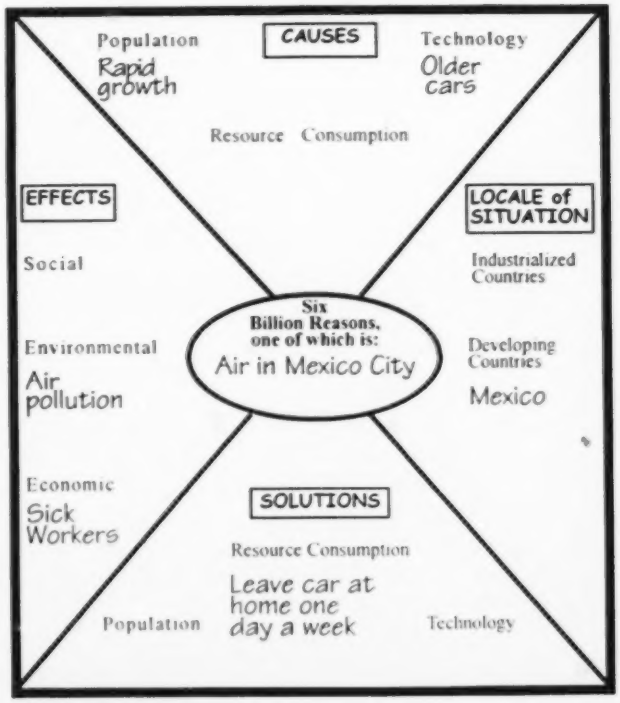
Allow two days for students to collect their articles and/or news summaries. Distribute copies of the student worksheet, and have students diagram the information from their resources.

For example, if an article on air pollution in Mexico City states that the local government has enacted legislation mandating one carless day a week, the student could enter "Mexico" under the "Developing Countries" category in the "Locale" quadrant. The student might note in the "Cause" quadrant that Mexico City, still growing rapidly, is one of the planet's most populous urban areas. Also, drivers in the city use cars without many of the technological devices designed to minimize pollution. The students might recognize environmental effects, such as smog, or social or economic ones, such as health problems and the resultant decrease in worker efficiency. "Leave car at home one day a week" would go under "Resource Consumption" in the "Solutions" quadrant. You may want to chart a sample article with the class so that students understand the concept.

Emphasize that students should include as much information as possible on their chart. While not every category will have something listed, students should be sure that the solutions they include address the causes and effects they have noted. Encourage the students to think of possible solutions that were not necessarily addressed in their articles.

Once the students have completed their individual matrices, draw a large population matrix on the butcher paper or the chalk board. Use this large matrix to summarize information from the students' charts. The middle circle can simply be labeled "Six billion people," rather than trying to list all the article titles.

SAMPLE



Discussion:

1. Discuss the proposed solutions: Which seem most feasible? Which seem least feasible? What are the barriers to implementing some of the proposed solutions.

2. Discuss the similarities and differences that emerge: What differences exist between the types of problems students found in heavily industrialized countries compared to those in less developed countries? Are there also differences in the kinds of solutions they seek? What factors contribute to these differences?

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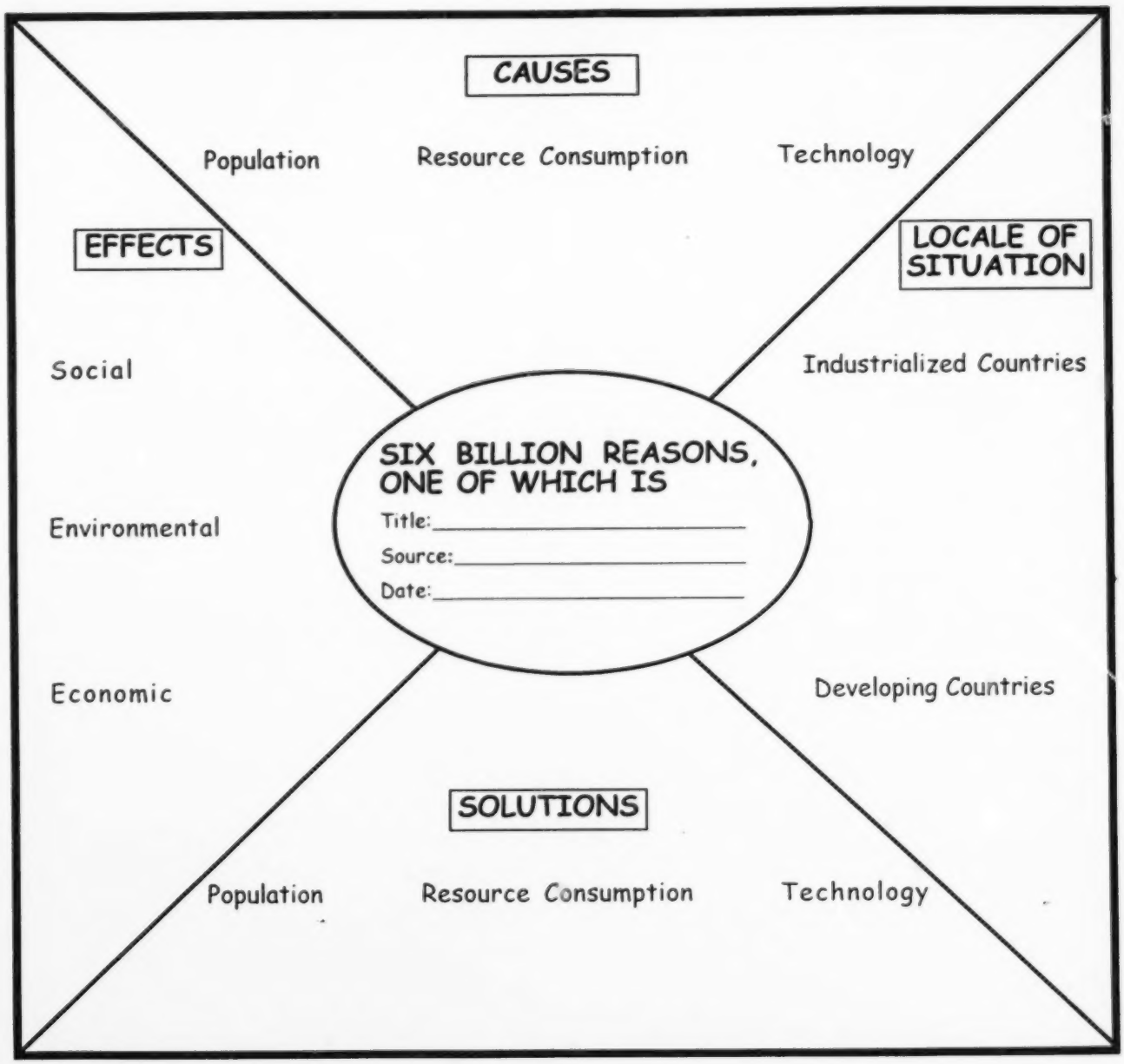
Six Billion Reasons

STUDENT WORKSHEET



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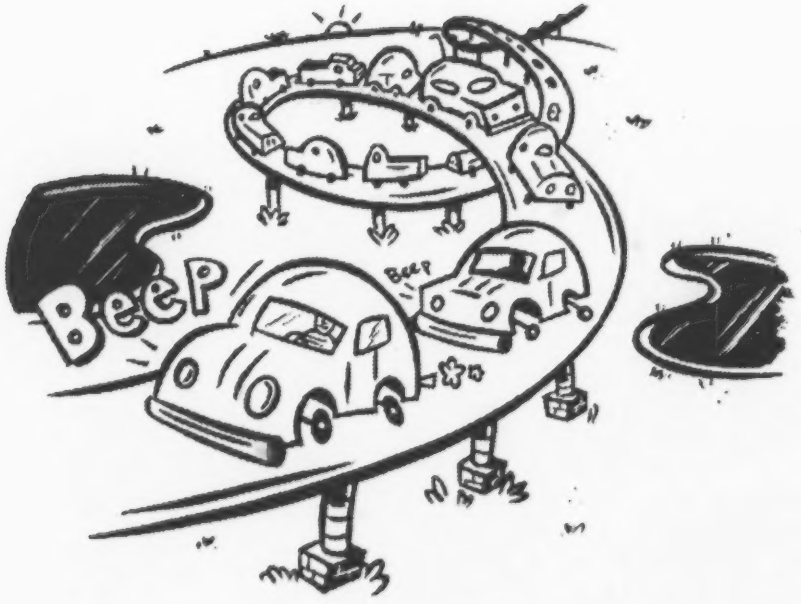

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